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[Home](#) > [Newsletters](#) > [EO-Express](#) > [2010](#) > [Express](#)

Earth Observation Express


[Other Editions](#)
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1. Understanding and Predicting Marine Wind in Canada's Coastal Zones With RADARSAT-2

Understanding and predicting weather, and particularly winds, in Canada's coastal zones is critical to ensuring economic wellbeing as well as safety and security of Canadians. Economic activity is increasing on both the Pacific and Atlantic coasts, as well as on the Great Lakes. Timely information on winds over sea, at scales that only SAR satellites can provide, is key to provision of improved marine forecasts as well as forecasts for adjacent coastal areas. Through the Canadian Space Agency (CSA) Government Related Initiatives Program (GRIP), Environment Canada (EC) is developing a project titled "The National SAR Wind Project for High Resolution Marine Wind". This project utilizes SAR satellite space-based monitoring, such as RADARSAT-1, RADARSAT-2 and ENVISAT ASAR data, for improving wind analysis and short-range prediction over large marine areas, and especially in the coastal zones. In partnership with EC Meteorological Service of Canada (MSC) National Laboratories, Storm Prediction Centres, the Canadian Meteorological Centre (CMC), the Department of Fisheries and Oceans (DFO), the Department of National Defence (DND) and the National Oceanic and Atmospheric Administration (NOAA), EC is implementing a national quasi-operational prototype of the SAR Wind system that is integrating up to 1600 SAR images per month. The project will validate cutting edge SAR technologies, develop new information products and applications to support decision-making and marine forecasting infrastructures, and evaluate the needs for the Canadian Government – critical for the development of a full operational SAR system. To read the full article and to view the products, please visit: www.asc-csa.gc.ca/eng/programs/grip/archive_101021.asp.

2. Biodiversity: Conservation and Protection of Fish Habitats In the Gulf of Mexico by Using Canadian Earth Observation Technologies

Habitat protection is coming under the spotlight at the UN Convention on Biological Diversity's 10th Conference of the Parties (COP 10), being held in Nagoya, Japan. This animation, based on Earth Observation (EO) data, shows the impact of the DeepWater Horizon oil spill on the spawning habitat of Atlantic bluefin tuna. To simulate bluefin spawning habitats and larvae development,

scientists used electronically tagged tuna and an ocean model based on in-situ ocean temperature profiles, sea-surface height data (from radar altimeters on Envisat) and ocean colour data (from MERIS on Envisat), which signify the presence of plankton (food). By overlaying the oil spill extent maps from Envisat's ASAR and the "spawning habitat index, it was possible to see where and how often the oil spill and spawning habitats had overlapped between 20 April and 29 August 2010. The Canadian Space Agency (CSA) contributed to the development of Envisat. To view the animation and products, please visit: www.esa.int/esaEO/SEM1K4WO1FG_index_1.html.

3. Partnership in the Energy Sector: Critical Infrastructure Monitoring With RADARSAT-2

The National Strategy and Action Plan for Critical Infrastructure establishes a risk-based approach for strengthening the resiliency of Canada's vital assets and systems such as energy and utilities, transportation and public safety systems. In light of the interconnected nature of Canada's critical infrastructure, partnerships are required among government and critical infrastructure stakeholders, including owners and operators, law enforcement and the research and development community. Building on this approach, Public Safety Canada works with its partners to manage risks, reduce vulnerabilities and strengthen the resiliency of critical infrastructure. Through the Canadian Space Agency (CSA) Earth Observation Applications Development Program (EOADP), the Canadian company C-CORE (St. John, Newfoundland), in cooperation with the Canadian Nuclear Safety Commission (CNSC), is developing a project titled "Critical Infrastructure Monitoring for the Energy Sector (CIMES)". The goal of this project is to develop RADARSAT-2 products specifically tailored for monitoring elements of the Nuclear Fuel Cycle (NFC). Facilities that can be monitored include nuclear safeguards, mines, processing facilities, power plants, long term storage facilities and tailings and hydro power dams. This project completes this fiscal year and has demonstrated RADARSAT-2's capability for monitoring critical infrastructure as applied to five varied test sites. RADARSAT-2's all-weather, night and day monitoring is perfectly suited for surveillance of these vital assets. For more information, please contact stephen.churchill@c-core.ca or yann.denis@asc-csa.gc.ca.

4. RADARSAT-2: Topographic Data Acquisition for the Northern Mapping Requirements

The Centre for Topographic Information - Sherbrooke (CTI-S) is responsible for the acquisition, management and exploitation of digital topographic information to promote Canada's sustainable use of natural resources, environmental protection, economic development opportunities, and political, security and sovereignty issues. In connection with the Canadian Space Agency (CSA) Government Related Initiatives Program (GRIP), CTI-S is developing a project entitled "RADARSAT-2: Topographic Data Acquisition for the Northern Mapping Requirements". Most of the maps of Canada's North were produced between the 1950s and the early 1970s, although some areas remained inaccessible. Today, with RADARSAT-2, topographic data can be acquired for the entire territory, information that is sometimes impossible to acquire using other satellites. The unique characteristics of the satellite (high resolution, polarimetry, east- or west-looking) are becoming important tools for completing the mapping of Canada's North. In collaboration with the Canadian Centre for Remote Sensing (CCRS), the project team is developing new photogrammetric and radargrammetric methods, using data from RADARSAT-2, to evaluate the potential for topographic mapping. One of the solutions developed by the CCRS can now be accessed in the PCI image processing software. Using a new hybrid

3D model that is accurate to 25 cm, the CCRS work will make it possible to produce mosaics and orthoimages automatically, without a ground control point. This opens the door to new applications in new environments where there are few or no ground control points (the North, glaciers, deserts, mountains, etc.). At the end of the project, the CCRS will have in place a production system that will be able to provide users of the North with reliable, accurate and up-to-date digital topographic data comparable to the data available in Canada's South. For more information, please contact daniel.clavet@RNCAN-NRCAN.gc.ca or paul.briand@asc-csa.gc.ca.

5. Mitigation of Active Geohazard Sites in Eastern Canada with RADARSAT-2: Unstable Rockslope Impacting a Railway Corridor

Critical infrastructure consists of physical and information technology facilities, networks, services and assets that are critical to the well-being, operations and continuity of Canada. Canada's critical infrastructure is vulnerable to disasters, whether natural (e.g., pandemic, floods, landslides) or human-induced (e.g., terrorism, computer viruses). The Canadian Space Agency (CSA) through its Government Related Initiatives Program (GRIP) supports a project titled "InSAR monitoring of active Geohazard sites in Eastern Canada" (2009-2012). One activity related to the project concerns the monitoring of an unstable rock slope impacting a railway along the Baie des Chaleurs coast. A series of reference targets have been strategically installed in 2009 in order to maximize the coherent point target InSAR potential. After a full year of monitoring, significant displacements were estimated from InSAR analysis and compared against in situ instrumental measurement. Early results of our Eastern Canada Geohazard InSAR project were presented at the Annual Canadian Geotechnical Society Conference- Geo2010- in Calgary last September and at the 3rd CSA RADARSAT-2 workshop in September 2010. The InSAR component of project is conducted by NRCAN-Canada Centre for Remote Sensing, in close partnership with U. Laval (Dept. Eng. Geology and Geology), NRCAN-Geological Survey of Canada, Transport Canada, Ministère des transports du Québec and Chemin de fer Baie des Chaleurs. The main goals of the project are to demonstrate the capability of high-resolution InSAR data derived from RADARSAT-2 as an integrated geohazard monitoring tool for active geohazard sites affecting critical infrastructure in Eastern Canada and to build InSAR capacity within NRCAN/ESS and universities, and other partners to produce InSAR products. For more information, please contact vern.singhroy@NRCAN-NRCAN.gc.ca; francois.charbonneau@NRCAN-NRCAN.gc.ca; rejean.couture@NRCAN-NRCAN.gc.ca or guy.aube@asc-csa.gc.ca.

6. InSAR Specialist Position with the Alberta Geological Survey

The Alberta Geological Survey (AGS) is working with the Canadian Space Agency and Canada Centre for Remote sensing to apply satellite-based interferometry to map ground movements associated with natural hazards (landslides, coal mine collapse) and human induced hazards in Alberta. In order to continue to advance the application of these technologies, the AGS is looking for a remote sensing specialist with a specialization InSAR processing to join their team. The posting can be found at: www.ags.gov.ab.ca/employment.html. For more information on AGS and their project visit www.ags.gov.ab.ca or contact corey.froese@ercb.ca.

7. 3rd RADARSAT-2 Workshop

The third RADARSAT-2 Workshop took place at the Canadian Space Agency

(CSA), St-Hubert, Quebec, on Sept 27 - Oct 1 2010 with close to 300 participants. The main objective of the Workshop was to inform all potential users of the utilizations of RADARSAT-2 data from an operational, commercial and Research and development perspectives. Results from more than 100 projects supported by CSA Earth Observation Applications and Utilizations Division were presented during the workshop. An updated status on the RADARSAT Constellation Mission was also provided to the participants. The final program is available on the webpage: www.asc-csa.gc.ca/eng/events/2010/radarsat2.asp. Presentations are also available upon request. For more information, please contact: SymposiumRadarsat2@asc-csa.gc.ca.

8. Calls for Sentinel-1 Mission Advisory Group Members

Within the framework of the Global Monitoring for Environment and Security (GMES) initiative, the European Space Agency (ESA) is developing a series of 'Sentinel' Earth Observation (EO) satellites. As part of this development process, ESA has released a call for Mission Advisory Group members for the Sentinel-1 mission. For more information, please visit: missionadvice.esa.int.

9. Energy: Giant Wind Farm Opens

The world's largest offshore wind farm, off the UK's Kent coast in the North Sea, is seen in this Envisat radar image, acquired on 14 September 2010. The Thanet Offshore Wind Farm opened on 23 September 2010, boosting UK wind energy capacity by 30%. The Gunfleet Sands Offshore Wind Farm is visible off the Essex coast on the image (centre top), and the port town of Dover is seen in the bottom as a white circular feature on the coastline:
download.esa.int/images/imageoftheweek/ASAR_UK_wind_farms_14_Sep_2010_with_text_v1.jpg.

10. The Northwest Passage Seen By RADARSAT-2

The Canadian Space Agency (CSA) RADARSAT program was born out of the need for effective monitoring of icy waters. Launched in 1995, RADARSAT-1 was joined by RADARSAT-2 in December 2007. Today, Canada is a world leader in the operational use of Earth Observation satellites for sea ice monitoring. Radar satellites have an advantage over aerial surveillance missions. They operate day and night in all weather conditions, and provide timely coverage of vast and remote areas like the Arctic. It is also a cost effective way of obtaining information over a large period of time. To view a mosaic of the Canadian North (September 4 to 6) made with RADARSAT-2 images, please visit: www.ec.gc.ca/glaces-ice/default.asp?Lang=En&n=0417829C-1&wsdoc=5A81DBA2-BF29-4EAC-BEFA-7E2B384C307F.

11. Ocean Circulation: Better Understanding With SMOS

The new Soil Moisture and Ocean Salinity (SMOS) water mission has taken another step forward by demonstrating how it will lead to a better understanding of ocean circulation. Using preliminary data, scientists can clearly see how surface currents affect the 'Amazon plume' in the open sea. SMOS has been delivering observations of 'brightness temperature' to the science community since mid-July. Canada is a cooperating member of ESA and contributed to the development of SMOS. Array Systems Computing Inc. (Toronto, Canada) in collaboration with the Expert Support Labs (ESL), ESA and CSA, has successfully developed the SMOS Level 2 Soil Moisture processor. For more information, please visit:

www.esa.int/esaEO/SEM1Y7EODDG_index_0.html.

12. International Assistance: Slovenia Benefits From Canadian Earth Observation Technology During Floods

On September 22 2010, heavy rainfall of 210mm in 24 hours has led to flooding and landslides across South Eastern and central Slovenia, affecting the capital Ljubljana and Posavje region, damaging property, roads and railways. RADARSAT-2 images of affected regions were acquired on September 22 2010. Flood products have been derived from RADARSAT images to better manage the event. The products were sent to the Scientific Research Centre (ZRC) in Slovenia. To learn more or to view the products, please visit: www.disasterscharter.org/image/journal/article.jpg?img_id=84842&t=1285227793897.

13. European Commission Launched the Marine Knowledge 2020 Initiative

On 13 September 2010 the European Commission (DG Maritime Affairs and Fisheries) presented the Marine Knowledge 2020 initiative which aims to improve knowledge of Europe's seas and oceans. In line with the EU 2020 economic strategy, the initiative is one of the three cross-cutting goals of the EU Integrated Maritime Policy. For more information, please visit: eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52010DC0461:EN:NOT.

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